NOAA Ship OSCAR DYSON

Cruise DY-08-09 Leg I Metadata
ECHO INTEGRATION-TRAWL SURVEY OF WALLEYE
POLLOCK ON THE BERING SEA SHELF
02 – 19 June 2008

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Directory Structure of the DY-08-09 Leg I Cruise Data DVD:

- CTD Data – contains Sea-Bird CTD data and program files, and .pdf scans of CTD cast sheets.
- Data Documentation – contains folders and files which document the data contained on the DVD
    - 2008 Seabird Instrument Calibrations folder – contains scans of maintenance and calibration paperwork for Seabird instruments used during the cruise.
    - Furuno (SeaTemp) Calibration Data folder – contains data used in the calibration of the Furuno through-hull sea temperature sensors. Note: regression coefficients used for all SeaTemp-C-Cal (calibrated) data are from the 06 February 2008 comparison with MACE's SBE39, S/N 1396. All data from 26 January 2008 (warm water) and 06 February 2008 (cold water), and both SBE39s (S/N 1396 and S/N 1438), can be combined to generate more comprehensive regression coefficients. New coefficients can be applied to the raw Furuno sea temperature data (sensors: High-SeaTemp-C, Mid-SeaTemp-C, and Low-SeaTemp-C). Contact SST Kathy Hough if future, cold water, calibration data is desired for refinement of regression coefficients.
    - ITI Comparisons folder – contains data and graphics used to compare ITIs.
    - Speed Comparisons folder – contains data and graphics used to compare sensor speeds.
    - Weather folder – scans of Deck Weather Observation sheets. Observations are in ADT.
    - Data File Variables.xls – lists the SCS sensors logged to Bridge, NavMetOce, SciSeawaterSystem, and OceoOps EventData files.
    - Derived Sensor Problem.doc – describes a SCS programming bug that adversely affects all *derived* sensor *.Raw data files, and EventData files that utilize derived sensor values. It was also discovered that when instruments are turned off, the last written raw data values for ***non-derived*** sensors also continue to write to EventData files. Compare TSG-RAW_yyyymmdd-hhmmss.Raw files to SciH2OSys_SNAP_compiled.elg and SciH2OSys_Continuous_###.elg EventData files for possible examples of stagnant data. These are inherent programming aspects of the SCS software. It is not possible to edit all of the *.Raw or EventData files in the field.
    - Draft Mark ABL Corrections.pdf – contains corrections to draft mark heights above baseline. Draft marks are in reference to a horizontal flat baseline, not the keel.
    - Metadata.doc – this file.
    - MOA Snap_compiled.elg – comprehensive, partially edited file of events recorded by the bridge (individual data values not edited due to SCS programming bugs).
    - OceoOps Snap_compiled.elg – comprehensive, partially edited file of hero deck ops (data not compared to hand-written data forms and individual SCS sensor values not edited due to SCS programming bugs).
    - SciH20Sys_SNAP_compiled.elg – comprehensive, partially edited file of scientific seawater system events (individual data values not edited due to SCS programming bugs).

- o Sensor Comments.xls – copy of the primary sensor.scf file used during the cruise. This file describes the validity of each sensor, and thus each sub-directory/file in the "SCS Data" directory.
- SCS Data – contains:
    - o All raw sensor data in individual folders (GPSMX420, POSMV, TSG, Fluorometer, etc.).
    - o EventData folder (contains separate folders for all Events run during the cruise). Note: Use *_compiled* file versions if they exist; they contain any edits made and are comprehensive. Further editing may be required post-cruise.
        - Bridge – the event run on the bridge (contains MOA Snap, and MOA Continuous files at a 30-second logging rate).
        - NavMetOce – backup 5-second continuous data for the Bridge event (same variable format). This data, along with the MOA Continuous files, can be used to add or replace any Bridge event data line (i.e. Doppler ON/OFF, Sunrise/Sunset, etc.) in the MOA Snap files.
        - OceoOps – the event run in the dry lab next to the Seabird computer and used to log CTD, XBT, and mooring operations.
        - SciSeawaterSystem – event run in the Chemlab next to the scientific seawater system. See SciH2OSys_SNAP_compiled.elg for sample data, cleaning events, system outages, and comments about system data.
        - SciSeawaterSystemBackup - backup continuous data for the SciSeawaterSystem event
        - SpeedComparison – event created to log all speed variables being used in the evaluation of the EMLOG (partially used once).
        - TrawlEvent – trawl event files logged by MACE personnel
        - NODC, NWS, SAMOS, and TsgTransmitter – unrelated projects to the cruise, but folders contain potentially useful files.
- XBT Data – contains XBT *.rdf (raw) and *.edf (exported) data files.

EventData Editing Notes:
- Bridge EventData
    - o DOPPLER ON/OFF lines: The Doppler was turned on and off, typically when approaching and leaving shallow areas or during station operations. Doppler ON and OFF buttons were incorporated into the Bridge event. Doppler ON/OFF lines were checked and are within seconds of .RAW data records. Raw Doppler, Speed over Ground, and Centerboard position data contained within SCS raw data can be used in combination to determine desirable time periods to include in EK60 data analyses.
    - o Centerboard position lines are within seconds of CenterBoard-RAW* data.
    - o Sunrise and Sunset times have been edited if Notes were made by bridge personnel. Missing Sunrise and Sunset times can be found by filling out Form B at http://aa.usno.navy.mil/data/docs/RS_OneDay.php
    - o 5-second NavMetOce Continuous data was inserted for several data gaps.
- OceoOps EventData
    - o Some edits (operation numbering, deleting extra event lines, etc.) were made in the "OceoOps Snap_compiled.elg" file; however, further edits and comparison to hand-written data sheets are needed post-cruise.
- SciSeawaterSystem EventData
    - o The Snap files have been compiled and edited in the SciH2OSys_SNAP_compiled.elg file. Sensor data values may be in error (see comments about SCS programming problems above, known logging errors below, and in the compiled file).

Additional Comments:

ALL data, except Deck Weather Observations, are in GMT/UTC unless otherwise noted.

Scientific Seawater System:
- All instruments were in one flow line. The order was: Fluorometer, ISUS, Oxygen Optode, SBE45 TSG.
- Water was typically 1.0 - 1.5 degrees Celsius warmer in the SBE45 TSG than at the bow intake (SBE38 temperature data). With dedicated flow to the SBE45 TSG, the temperature difference is typically 0.5 degrees Celsius.
- Flow tends to be lower going through Filter 1 (elevated above Filter 2 location).

Depth below surface data:
- If the centerboard was in the retracted position (SCS value = 13.5), then use the depth variable EK60-Depth-CBRet-m-Value **or** Doppler-Depth-m-Value (only if the Doppler was ON – check *.RAW data files to verify operational status).
- If the centerboard was in the lowered position (SCS value = 18.68), then use the depth variable EK60-Depth-m.

The following parent sensors were added to or changed in SCS on June 7, 2008:
- Doppler – VDXDR (Transducer measurements – data logged OK.)
- Doppler – VDDRU (Depth without keel offset not being output from Doppler unit – no data and do not need.)
- ITI – IITDS (Trawl door spread)
- EMLOG – VMVHW (Speed – data output from EMLOG ~ 5x/second with repetitive data. Slowed logging rate towards end of Leg I to 1x/second.)
- EMLOG – PPNK3 (Status – no data output from EMLOG unit.)
- EMLOG VMVLW (Distance - changed logging rate from 1x/hour to -1 (maximum). Maximum also equals ~5x/second. Slowed logging rate back to 1x/hour towards end of Leg I.)

XBTs:
- The RDF file extension stands for raw data file and can be viewed with Sippican, Inc. WinMK21 software.
- The EDF file extension stands for exported data file, and can be viewed with any text editor etc.
- EDF files with different salinity and calibration coefficients can be created with the WinMK21 software.
- It was discovered on June 10, 2008, that the XBT data acquisition computer clock was 8-9 minutes too fast. It is not networked, thus not set to synchronize with SymmTime. The time stamps in the RDF and EDF data files equal the computer clock even though there is a GPS data feed. This affects the data files for XBTs 1-25. See "XBT Log.pdf" or "OceoOps Snap_compiled.elg" files for correct launch times. XBTs 26-41 are time-stamped correctly in the RDF and EDF files.

Observed Problems with Sensor Data

Wind Speed and Direction: Wind (relative and true) data is variable and unreliable when the wind is coming from astern. All wind data needs to be examined in relation to Gyro Heading and SOG data. Some examples may be from previous cruises:
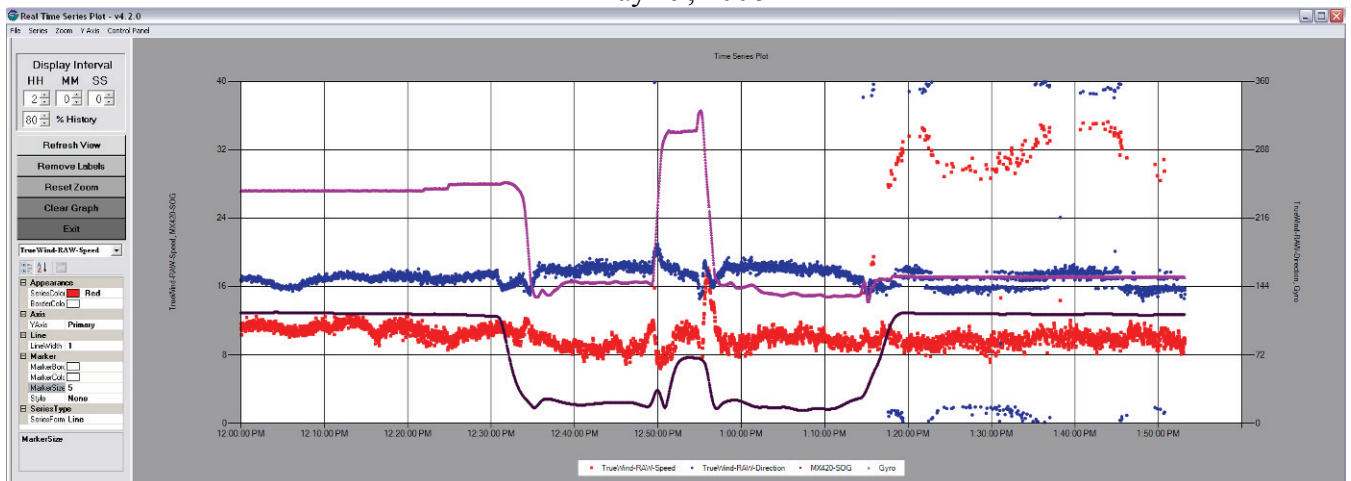
March 18/19, 2008
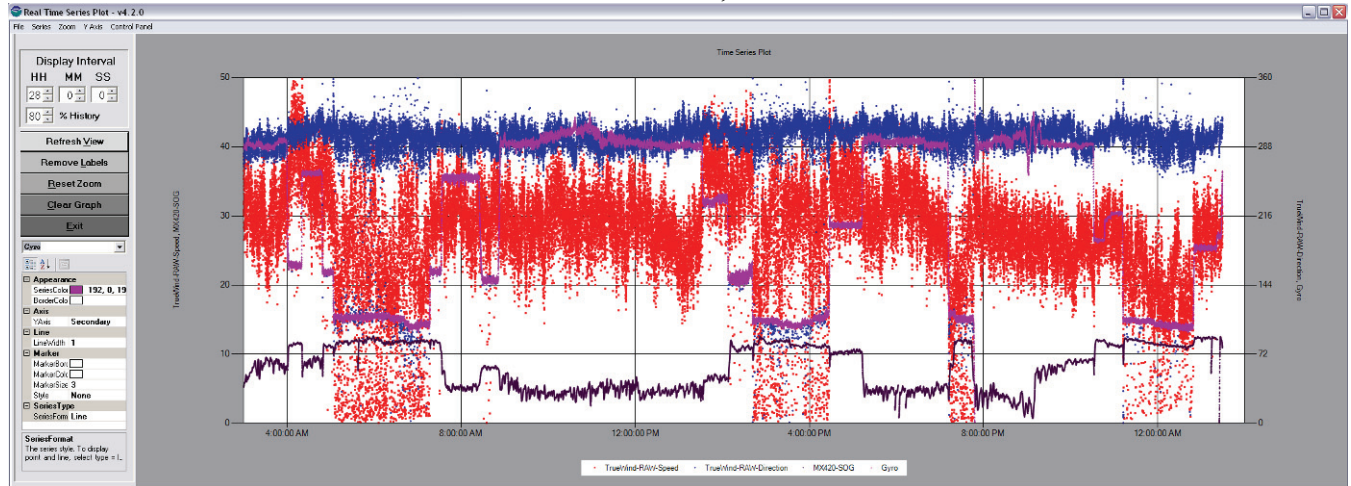
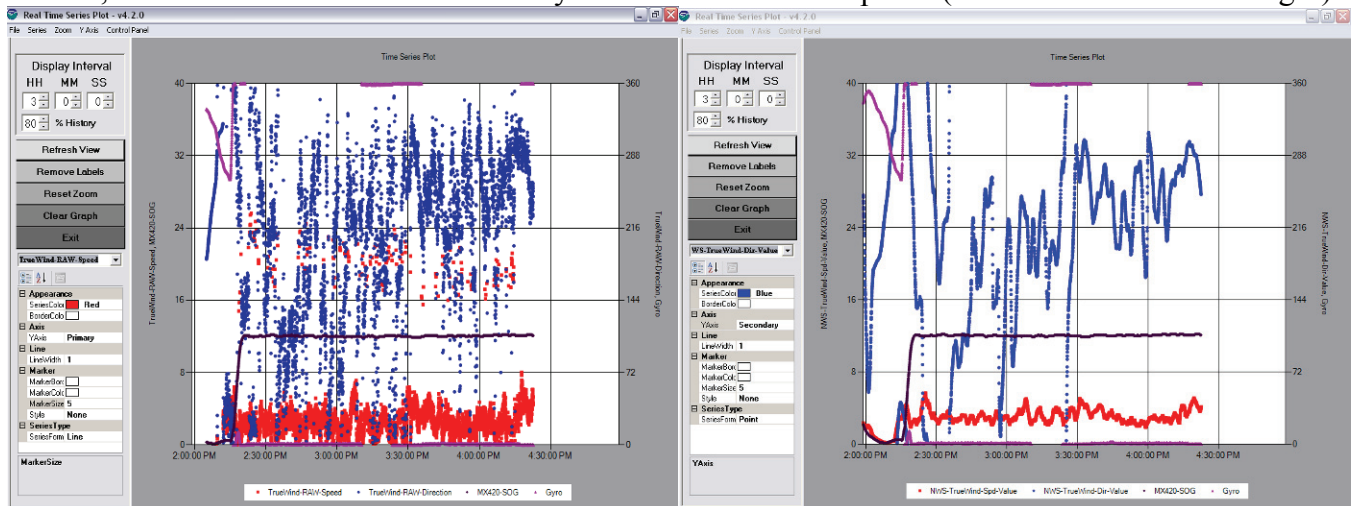May 20/21, 2008 – 1 minute averages (SAMOS) help smooth the data, but do not eliminate the error.
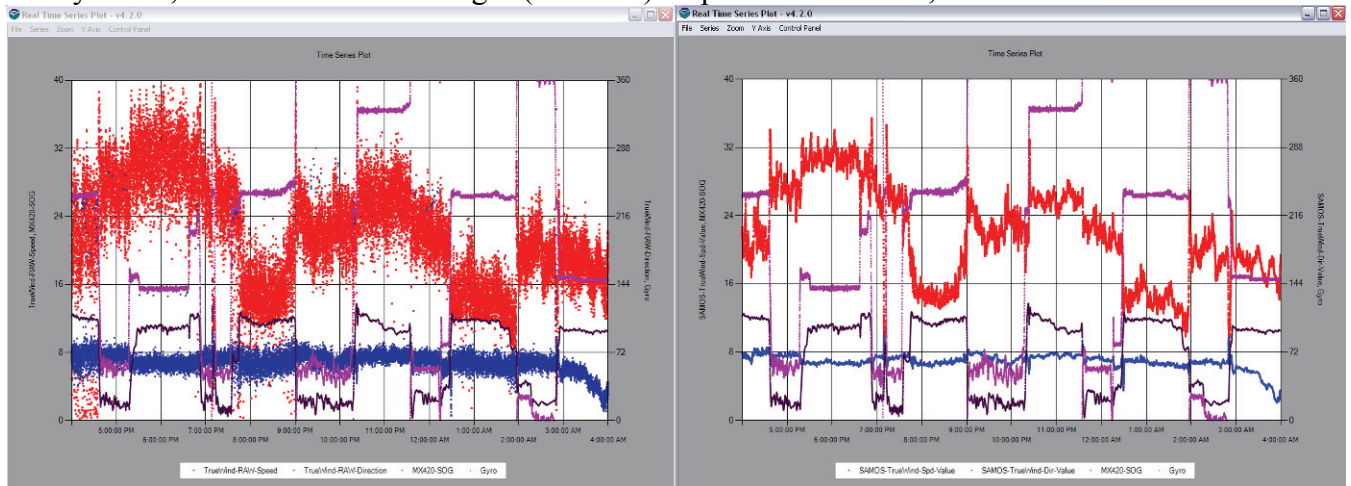
Wind data can be sporadic when heading directly into it too.
May 19, 2008

June 7, 2008 – Wind direction is extremely variable at low wind speeds (RAW and 2 minute averages).

Starting around 13:50 GMT on June 13, 2008, the RMYoung wind bird on the bow mast, the only one feeding data to SCS, became loose. 1 (SAMOS) and 2 (NWS) minute averaged data eliminate outliers, but are adversely affected by the high number of outliers (averages are lower than they should be for both wind direction and speed in the below example). Visually, the wind direction was coming from the starboard beam.

1 minute average data on the right (SAMOS)
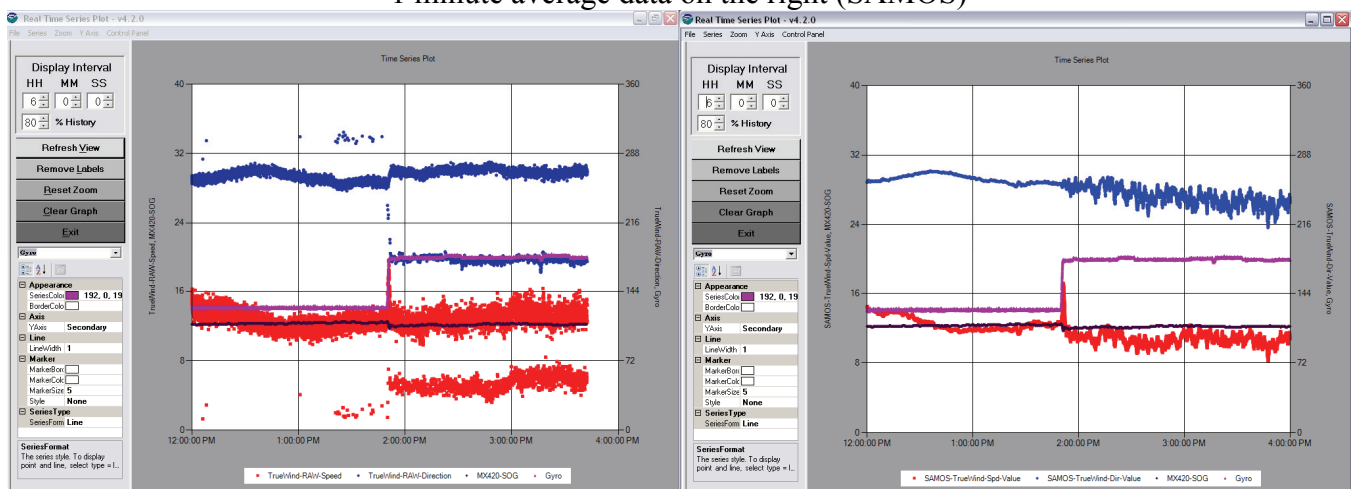
2 minute average data on the right (NWS)
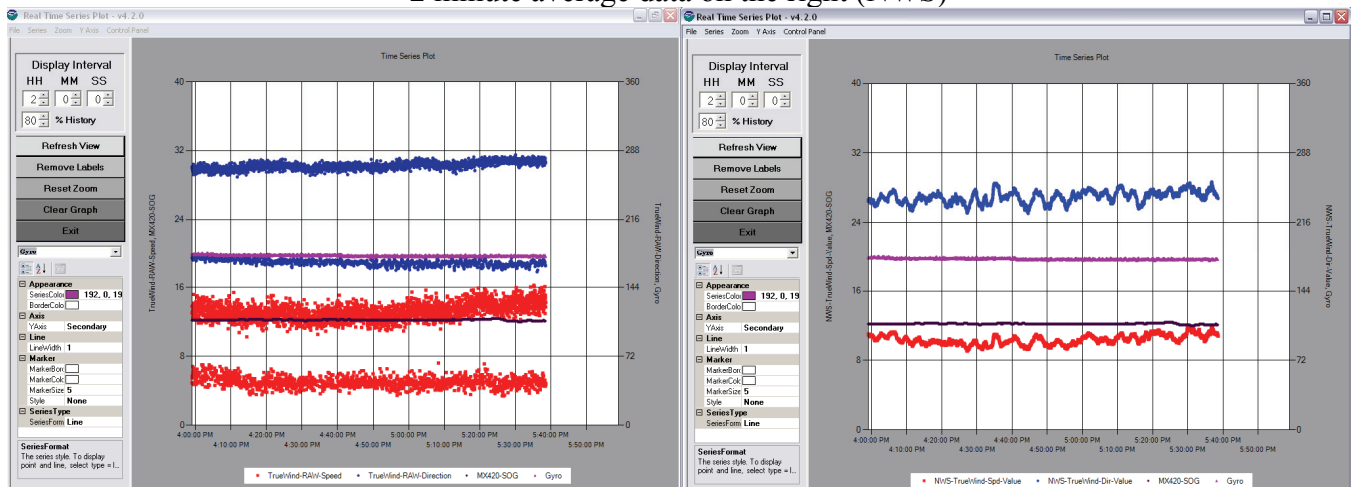
Air Temperature, Relative Humidity, Barometer Pressure: Other meteorological data are affected by ship heading.

June 8, 2008
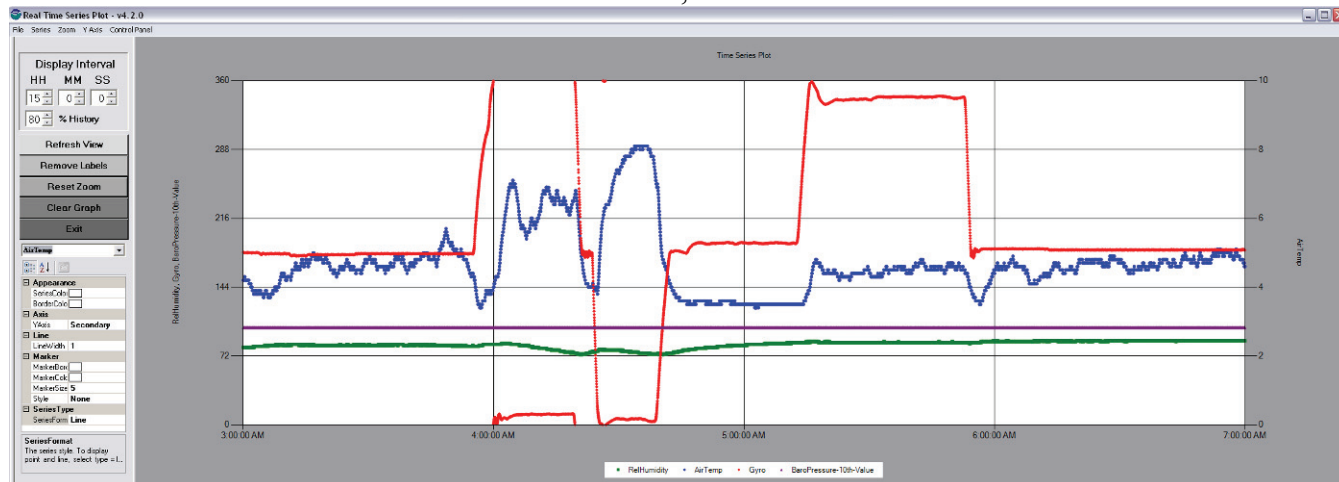
Scientific Seawater System

Rough seas may have resulted in air getting into the scientific seawater system. Until discovered, data flow to SCS does not get turned off; thus, erroneous data is logged to files (.RAW and EventData). SBE45, SBE38, Fluorometer, ISUS, and Oxygen data are affected. Also, changing filters causes brief, adverse effects on data. See SCS\EventData\SciSeawaterSystem\SciH2OSys_SNAP_compiled.elg for documentation of known events which may affect data. Examples are below (some are from previous cruises). Flow meter data from the unit in the Chemlab can be used to extract useful data periods (SCS SSSFlow-*_yyyymmdd-hhmmww.Raw data files).

Rough seas can cause erroneous data periods and subsequent system shutdowns.
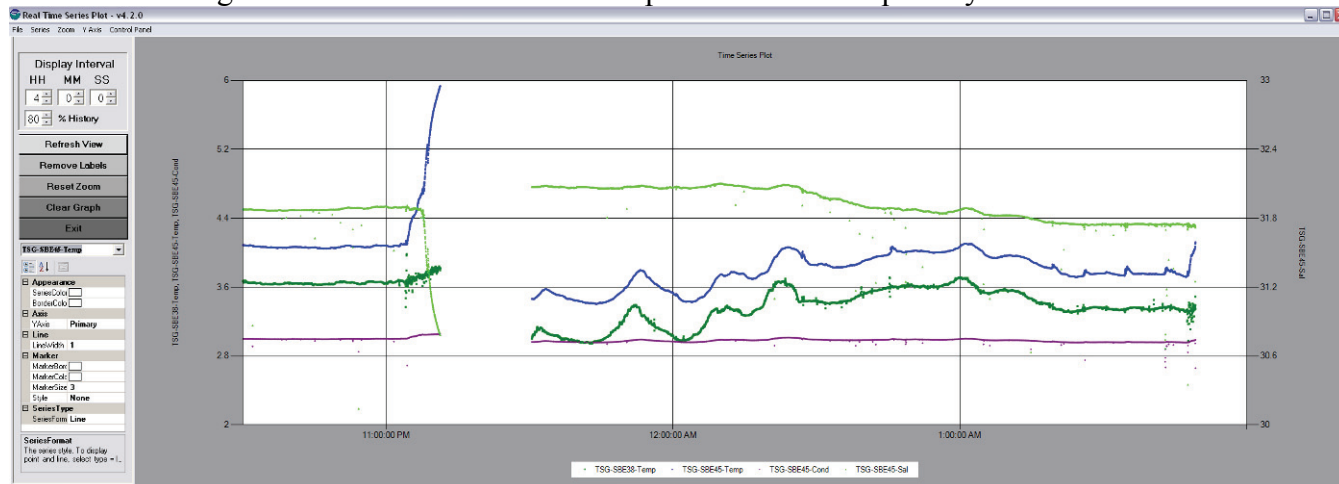
Changing filters at the TSG/Fluorometer system causes slight, temporary effects to at least the SBE45 data. See SCS\EventData\SciSeawaterSystem\SciH2OSys_SNAP_compiled.elg for filter change times.
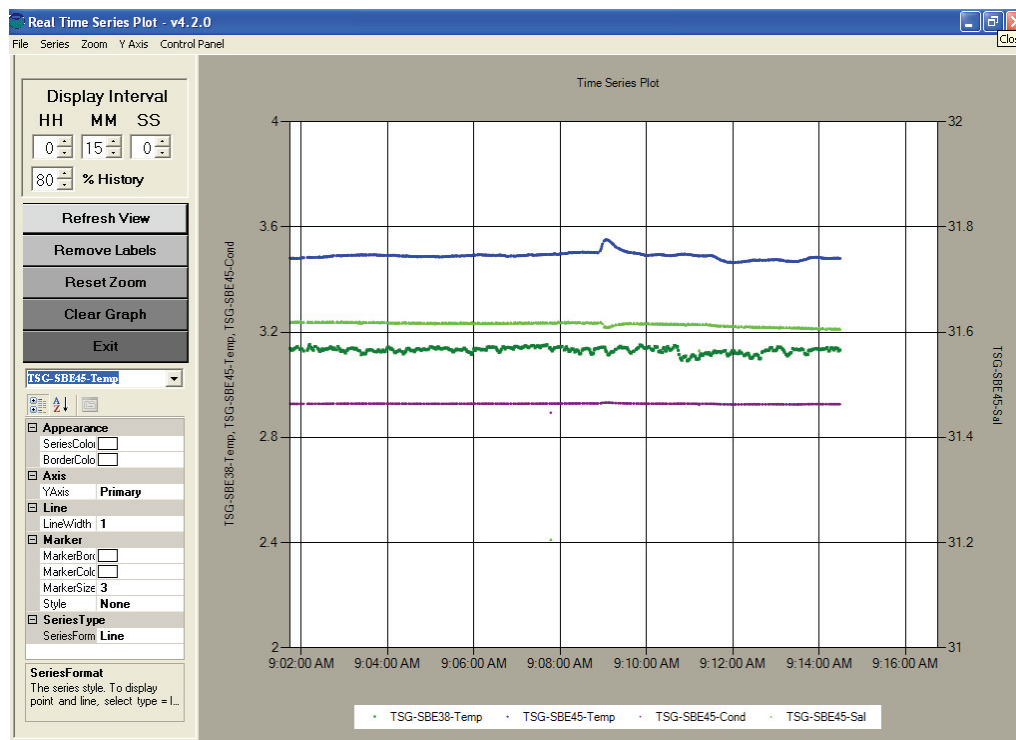
May 15, 2008 - Periods of low flow cause the difference between the SBE38 and SBE45 temperatures to increase. The below is a result of the ISUS filter being dirty on a previous cruise.
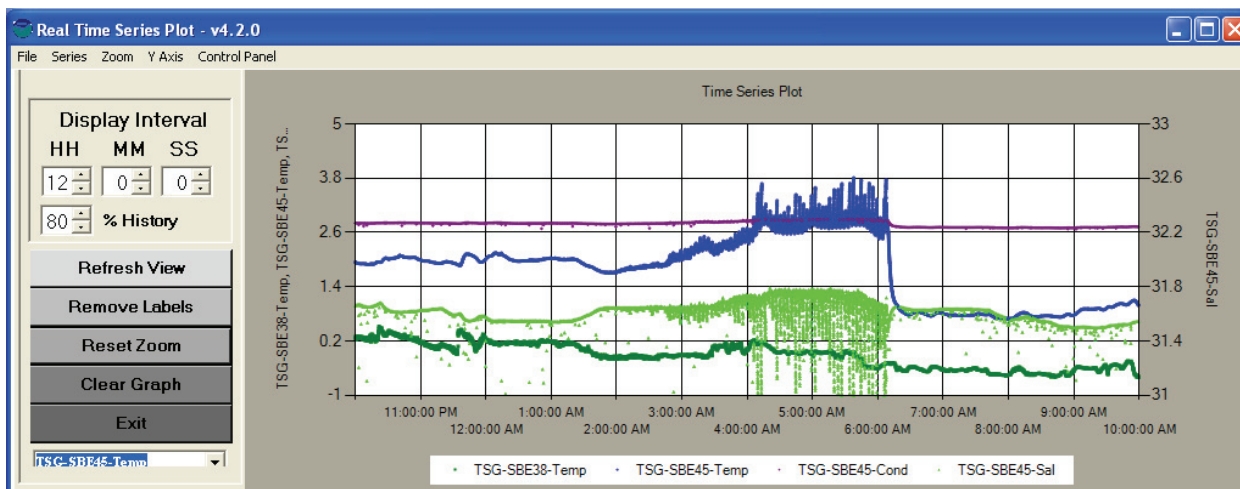
June 3, 2008 – System start-up and re-starts after cleaning result in delayed stabilization of data.
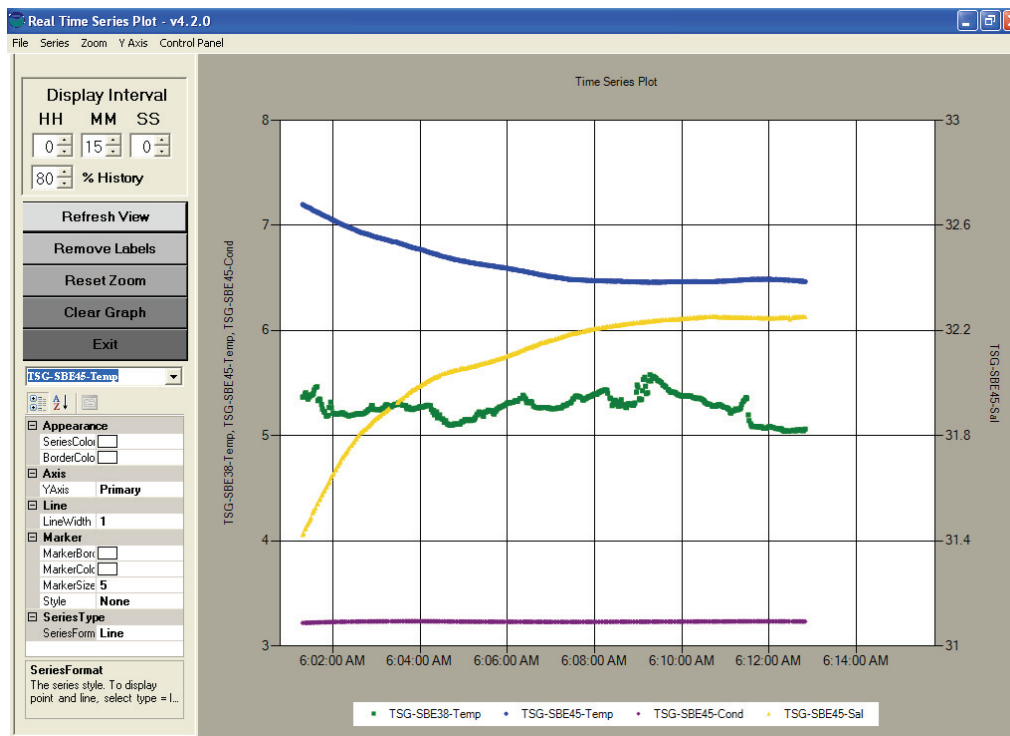
Furuno Hull (HIGH, MID, LOW) Sea Temperatures: These three water temperature sensors are arranged vertically just forward of the hero deck on the starboard side. There is 0.75 m between each adjacent pair of sensors; 1.5 m between HIGH and LOW.

Raw sensor data is not calibrated; the MID sensor is noticeably ~0.3 C higher than the HIGH and LOW sensors. SBE39s have been lowered to the locations of each Furuno hull temperature sensor in order to calibrate them and compare them to the SBE38 temperature sensor that is at the bow intake (this water feeds the scientific seawater system). One calibration was done in Seattle, and a second calibration was done off Kodiak Island on February 6, 2008. See "\Data Documentation\Furuno (Hull Temp) Calibration Files" directory for the raw calibration data.

The top image shows un-calibrated data; the bottom image shows calibrated data based on the February 6, 2008 (cold water) regression coefficients for SBE39, S/N 1396:
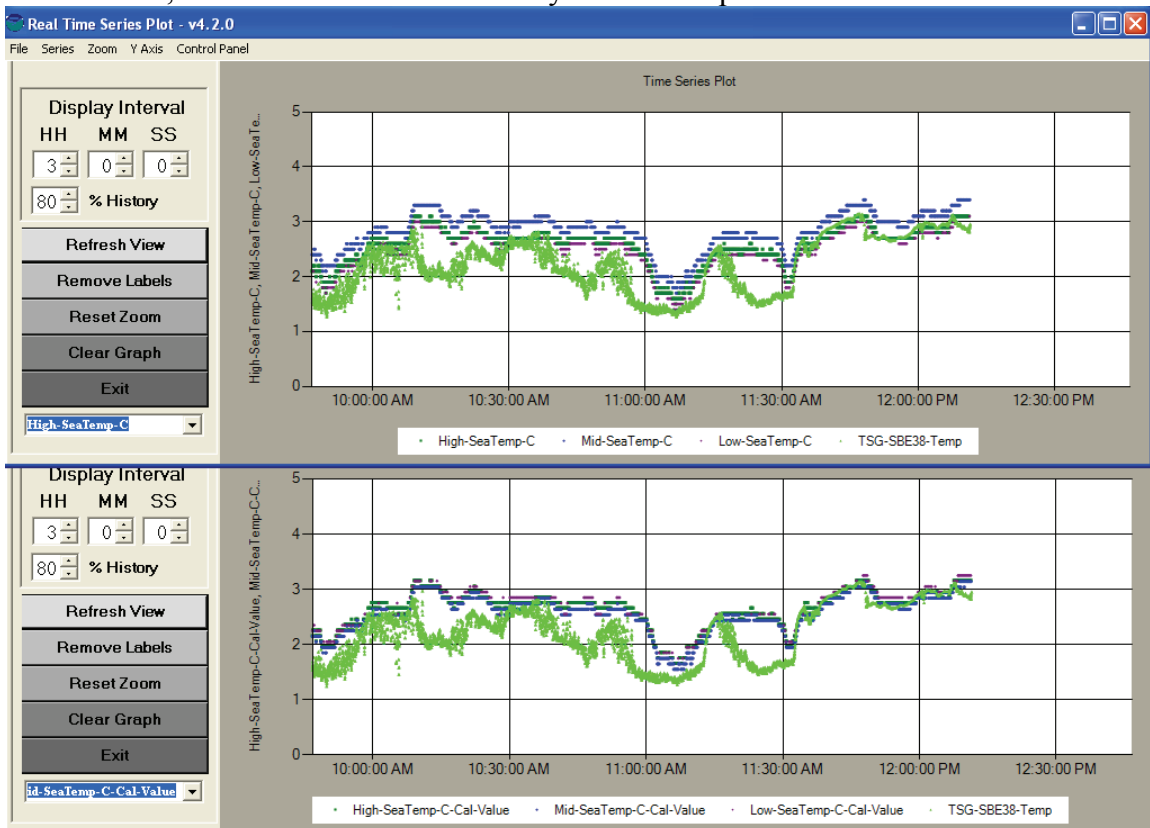
> HIGH: m = 1.000015, y = +0.064798
> MID: m = 0.999948, y = -0.254865
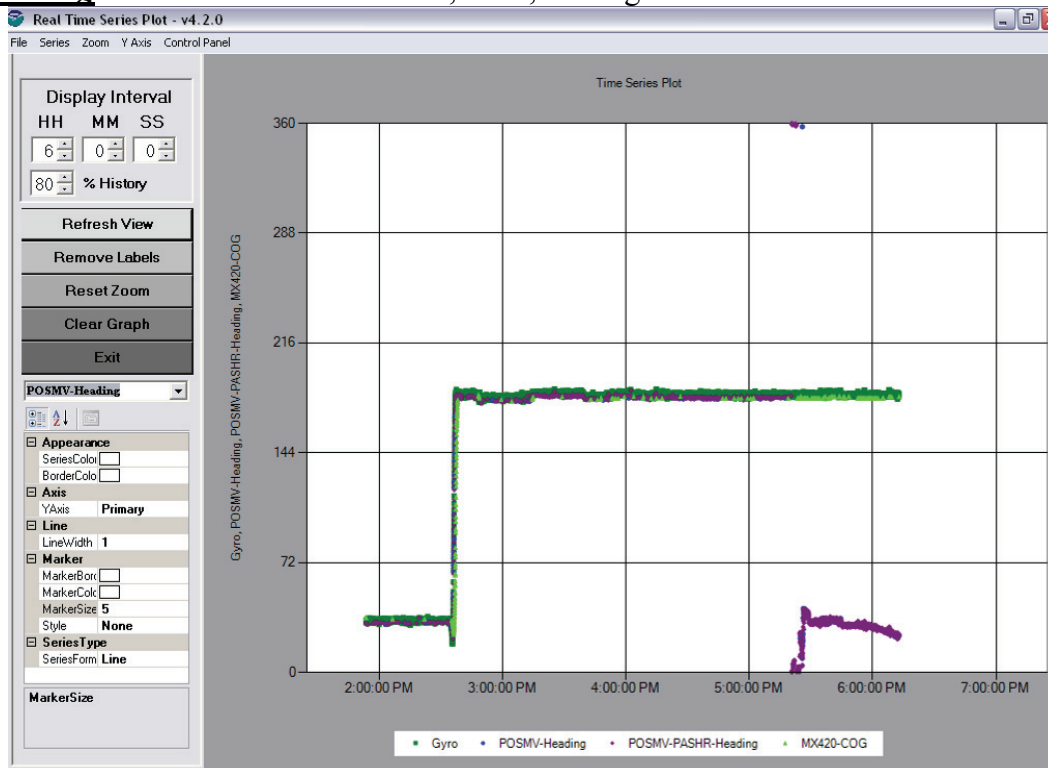> LOW: m = 1.000150, y = +0.149487

June 5, 2008
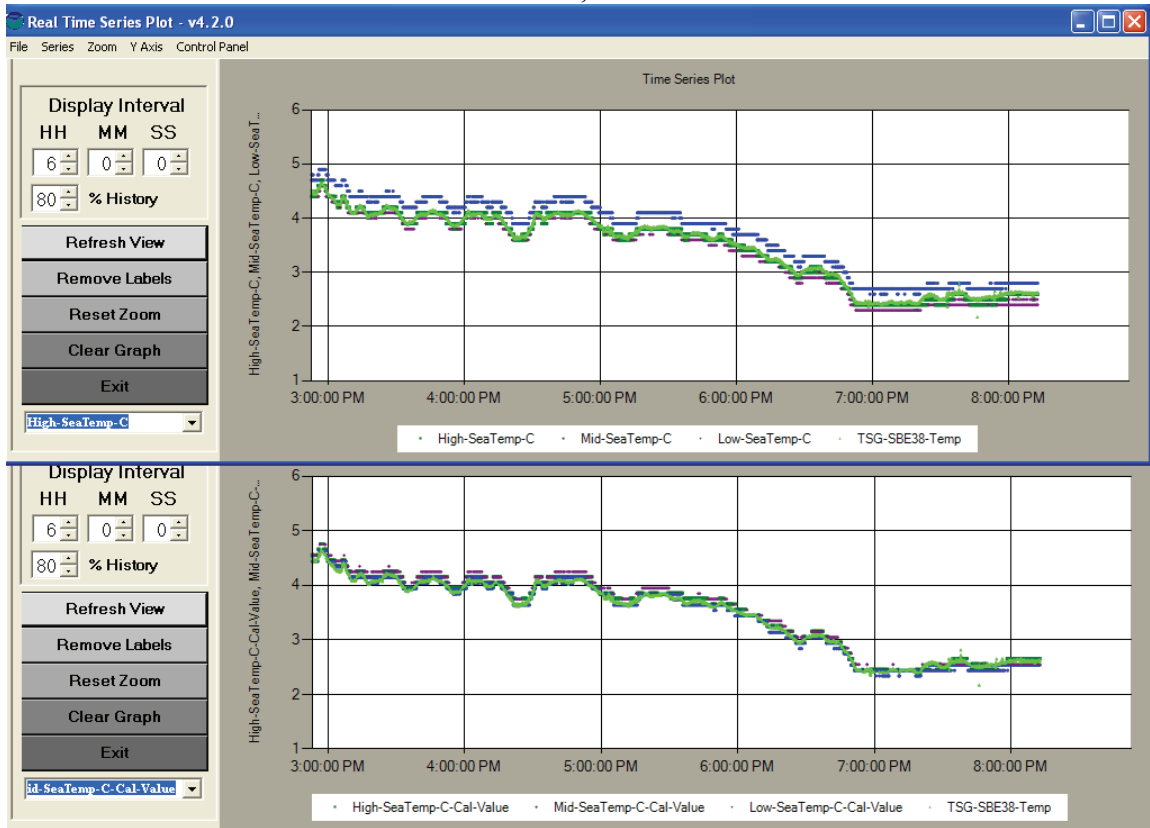
June 4, 2008 – Inconsistent and noisy SBE38 temperature data was observed.

POSMV Heading values were in error June 6, 2008, starting at 17:20 GMT. POSMV reset.

Corresponding POSMV COG and SOG data may have also been affected during the above time period and any others for which heading data became offset.

Doppler derived values: Any data variable with "Value" as part of the name is suspect due to SCS programming bugs. Even if the instrument is turned off, derived data continue to write to *.Raw and EventData files. See Derived Sensor Problem.doc for more details.

Example: Derived doppler depth (DBS) data on June 5, 2008 – CTD003